

REMARKS

Reconsideration of this application as amended is respectfully requested.

In the Office Action, claims 48-96 are pending. Claims 48-96 stand rejected. In this response, claims 48, 55, 67, 74, 83 and 90 have been amended. No new claims have been added. No claims have been canceled. Thus, claims 48-96, as amended, remain pending. Support for the amendments can be found throughout the specifications as filed. No new matter has been added. Applicant reserves all rights with respect to the applicability of the Doctrine of Equivalents.

Amendments

Rejections

Rejections Under 35 U.S.C. 103(a)

Claims 48-56, 58, 60 and 62

Claims 48-56, 58, 60 and 62 stand rejected under 35 U.S.C. §103(a) as being unpatentable over US Patent No. 5,892,899 to Aucsmith et al. (hereinafter “Aucsmith”) in view of US Patent No. 5,978,883 to Charaf Hanna (hereinafter “Hanna”). However, Applicant respectfully submits that Applicant’s claims 48-56, 58, 60 and 62, as amended, are patentable over the cited references.

Specifically, for example, independent claim 48, as amended, includes the limitations of:

“means for storing an obfuscated stream, the obfuscated stream comprising parts which are interleaved, the parts having been taken from at least two operative instruction streams including a first operative instruction stream and a second operative instruction stream, the first operative instruction streams being compiled from a first source code, the second operative instruction streams being compiled from a second source code separate from the first source code; and

means for executing the obfuscated stream;

wherein the parts include a second part interleaved between a first part and a third part, the second part being of the second operative instruction stream, the first part and the third part being of the first operative instruction stream;
wherein the second part is reachable from the first part during the execution; and
wherein when the first part and the third part are executed, the second part is also executed”
(emphasis added)

Applicant's amended claim 48 includes the limitations of storing an executable obfuscate stream including a second part of an operative instruction stream compiled from a first source code interleaved between a first part and a third part of another operative instruction streams compiled from a second source code to execute the second part reachable from the first part when the first part and the third part are executed. It is respectfully submitted that neither Aucsmith nor Hanna, individually or in combination, disclose or suggest the noted limitations.

Rather, Aucsmith describes a number of subprograms operating on a number of subparts of a secret for a security sensitive program (security approach) (Aucsmith, col. 1, lines 15-45). Aucsmith discloses a subprogram generator for generating a number of subprograms given a security secret and a subprogram library (Aucsmith, col. 4, lines 20-40, Fig. 2). Clearly, a security input (such as a number) to a program generator associated with a library is not a source code. Aucsmith also provides interleaving the subprograms with unrelated tasks (Aucsmith, col. 4, lines 16-20). Additionally, Aucsmith includes other functions in a subprogram for other purposes or unrelated functions (Aucsmith, col. 6, lines 23-26). According to Aucsmith, a subprogram is stored in a mutated state, recovered in plain text when needed for execution and mutated again when executions are completed (Aucsmith, col. 5, lines 30-36). Aucsmith also teaches an obfuscated subprogram stored in a memory cell in a memory segment (Aucsmith, col. 5, lines 24-28, Fig. 4). In Aucsmith, an obfuscated subprogram includes a mutation function and a jump block (a jump to the next subprogram) (Aucsmith, lines 53-58, Fig. 5). In addition, Aucsmith describes depending on whether an obfuscated subprogram is the last subprogram in an execution pass, the obfuscated subprogram either jumps to the next obfuscated subprogram or returns to the caller (Aucsmith, col. 8, lines 52-58). Thus, after

an initial subprogram is executed, Aucsmith does not perform tasks other than the subprograms until finishing executing the last subprogram. However, Aucsmith does not disclose or suggest an executable obfuscate stream including a second part of an operative instruction stream compiled from a first source code interleaved between a first part and a third part of another operative instruction streams compiled from a second source code to execute the second part reachable from the first part when the first part and the third part are executed.

Hanna, on the other hand, teaches a process for interleaving blocks of packets by writing data to an interleaving memory in a given order and by reading them back in an order corresponding to the interleaving (Hanna, Abstract). In Hanna, an interleaving of depth P is carried out by rearranging the bytes of P packets, each comprising L bytes, in such a way as to separate two successive bytes of a given packet by P-1 bytes (Hanna, col. 1, lines 39-45). Thus, Hanna is interleaving among individual bytes. Nowhere does Hanna teach or suggest a second part of an operative instruction stream compiled from a first source code interleaved between a first part and a third part of another operative instruction streams compiled from a second source code.

Further, Aucsmith is related to tamper resistant methods and apparatus for security sensitive programs (Aucsmith, col. 1, lines 6-9, col. 3, lines 49-51). Hanna, however, relates to interleaving of digital data before transmission and to deinterleaving after reception to make the transmission of digital data reliable (Hanna, col. 1, lines 8-14). Here, reliability and security belong to two distinct arts requiring quite different approaches. There is neither suggestion nor motivation to combine Aucsmith with Hanna.

Moreover, as noted above, Aucsmith executes all the subprograms before it returns to a caller. As a result, when an unrelated task is interleaved among subprograms generated in Aucsmith for implementing a security approach, the interleaved task cannot be reachable by the subprograms. Therefore, Aucsmith teaches away from Applicant's claimed inventions including the limitations of an executable obfuscate stream including a second part of an operative instruction stream compiled from a first source code interleaved between a first part and a third part of another operative instruction streams

compiled from a second source code to execute the second part reachable from the first part when the first part and the third part are executed.

As such, not only do Aucsmith and Hanna not disclose, individually or even in combination, the above noted limitations, but the references, considered as a whole, do not suggest the desirability and thus the obviousness of making the combination. It would be impermissible hindsight to combine Aucsmith and Hanna based on Applicant's own disclosure. Even if they are combined, such a combination still lacks the limitations set forth above.

In order to render a claim obvious, each and every limitation of the claim must be taught by the cited references. Therefore, in view of the foregoing remarks, it is respectfully submitted that independent claim 48, as amended, is patentable over Aucsmith and Hanna.

Independent claim 55, as amended, includes similar limitations as noted above. Therefore, for at least the similar reasons as discussed above, it is respectfully submitted that claim 55, as amended, is patentable over the cited references.

Given that claims 49-54, 56, 58, 60 and 62 as amended, depend from and include all limitations of one of independent claims 48 and 55, as amended, applicant respectfully submits that claims 49-54, 56, 58, 60 and 62 as amended, are patentable over the cited references.

Claims 57, 59, 61, 64 and 66

Claims 57, 59, 61, 64 and 66 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Aucsmith in view of Hanna, and further in view of an article by Cosoroaba, "Syschronous DRAM Evolutionary Changes Bring Cost/Performance Advantages in Memory Systems" (hereinafter "Cosoroaba"). However, Applicant respectfully submits that applicant's claims 57, 59, 61, 64 and 66, as amended, are patentable over the cited references.

Claims 57, 59, 61, 64 and 66 depend from independent claim 55, as amended, and include the limitations as noted above. It is respectfully submitted that Aucsmith, Hanna,

for reasons similar to those discussed above, or Cosoroaba, individually or in combination, fail to disclose or suggest the above noted limitations.

Cosoroaba describes memory system performance analysis and estimation for SDARM on the overall system performance (Cosoroaba, Introduction). However, nowhere does Cosoroaba disclose or suggest an executable obfuscate stream including a second part of an operative instruction stream compiled from a first source code interleaved between a first part and a third part of another operative instruction streams compiled from a second source code to execute the second part reachable from the first part when the first part and the third part are executed.

Further, Cosoroaba relates to SDRAM and system performance (Cosoroaba, Abstract). Aucsmith is related to tamper resistant methods and apparatus for security sensitive programs (Aucsmith, col. 1, lines 6-9, col. 3, lines 49-51). Hanna, however, relates to interleaving of digital data before transmission and to deinterleaving after reception to make the transmission of digital data reliable (Hanna, col. 1, lines 8-14). Apparently, memory system performance, data transmission reliability and security sensitive programs belong to three completely distinct arts. There is neither suggestion nor motivation to combine Aucsmith, Hanna and Cosoroaba.

As such, not only do Aucsmith, Hanna and Cosoroaba not disclose, individually or even in combination, the above noted limitations, but the references, considered as a whole, do not suggest the desirability and thus the obviousness of making the combination. It would be impermissible hindsight to combine Aucsmith, Hanna and Cosoroaba based on Applicant's own disclosure. Even if they are combined, such a combination still lacks the limitations set forth above.

In order to render a claim obvious, each and every limitation of the claim must be taught by the cited references. Therefore, in view of the foregoing remarks, it is respectfully submitted that independent claim 55, as amended, is patentable over Aucsmith, Hanna and Cosoroaba.

Given that claims 57, 59, 61, 64 and 66 as amended, depend from and include all limitations of one of independent claim 55, as amended, applicant respectfully submits that claims 57, 59, 61, 64 and 66 are patentable over the cited references.

Claims 67-96

Claims 67-96 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Aucsmith in view of Hanna, and further in view of a thesis titled “Java Control Flow Obfuscation” by Douglas Low (hereinafter “Low”). However, applicant respectfully submits that Applicant’s claims 67-96, as amended, are patentable over the cited references.

Specifically, for example, independent claim 67, as amended, includes the limitations as noted above. It is respectfully submitted that Aucsmith, Hanna, for reasons similar to those discussed above, or Low, individually or in combination, fail to disclose or suggest the above noted limitations.

Low argues the only feasible form of technical protection of mobile code such as Java bytecodes is code obfuscation (Low, 1.3). Low also provides an overview of Java obfuscation (Low, Chapter 6, Fig. 6.1). However, nowhere does Low disclose or suggest storing an executable obfuscate stream including a second part of an operative instruction stream compiled from a first source code interleaved between a first part and a third part of another operative instruction streams compiled from a second source code to execute the second part reachable from the first part when the first part and the third part are executed.

Further, as noted above, there is neither suggestion nor motivation to combine Aucsmith and Hanna. Hence, Aucsmith, Hanna and Low cannot logically be combined.

As such, not only do Aucsmith, Hanna and Low not disclose, individually or even in combination, the above noted limitations, but the references, considered as a whole, do not suggest the desirability and thus the obviousness of making the combination. It would be impermissible hindsight to combine Aucsmith, Hanna and Low based on Applicant’s own disclosure. Even if they are combined, such a combination still lacks the limitations set forth above.

In order to render a claim obvious, each and every limitation of the claim must be taught by the cited references. Therefore, in view of the foregoing remarks, it is

respectfully submitted that independent claim 67, as amended, is patentable over Aucsmith, Hanna and Low.

Independent claims 74, 83 and 90, as amended, include similar limitations as noted above. Therefore, for at least the similar reasons as discussed above, it is respectfully submitted that claims 74, 83 and 90, as amended, are patentable over the cited references

Given that claims 68-73, 75-82, 84-89 and 91-96 depend from and include all limitations of one of independent claim 67, 74, 83 and 90, as amended, applicant respectfully submits that claims 68-73, 75-82, 84-89 and 91-96 are patentable over the cited references.

CONCLUSION

In view of the foregoing, applicant respectfully submits the applicable rejections and objections have been overcome. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call the undersigned attorney at (408) 720-8300.

Authorization is hereby given to charge our Deposit Account No. 02-2666 for any charges that may be due. Furthermore, if an extension is required, then Applicant hereby requests such extension.

Respectfully submitted,

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